

**IN THE UNITED STATES DISTRICT COURT  
FOR THE EASTERN DISTRICT OF TEXAS  
MARSHALL DIVISION**

PACKLESS METAL HOSE, INC., §  
§  
Plaintiff, §  
§  
v. § CIVIL ACTION NO. 2:09-CV-265-JRG  
§  
EXTEK ENERGY EQUIPMENT §  
(ZHEJIANG) CO., LTD., §  
§  
Defendant. §  
§

**MEMORANDUM OPINION AND ORDER**

Before the Court is Defendant Extek Energy Equipment (ZHEJIANG) Co. Ltd.'s ("Extek") Motion for Summary Judgment, filed November 9, 2012 (Dkt. No. 81). Extek moves for summary judgment of non-infringement of United States Patents Nos. 5,409,057 ("the '057 Patent") and 5,551,504 ("the '504 Patent"). The Court having considered the same finds that summary judgment of non-infringement should be **GRANTED** for the reasons set forth below.

**I. Background and the Patents-in-Suit**

Plaintiff Packless Metal Hose, Inc. ("Packless") is the owner of the '057 Patent and the '504 Patent. The '504 Patent is a divisional of the '057 Patent. For ease of reference, the Court will cite to the specification of the '057 Patent. The patents-in-suit concern heat exchangers constructed with helically convoluted heat exchange elements.

In the Background of the Invention, the patentee observes that finned heat exchange elements are well known in the art for use in radiators, heat exchangers, refrigerators, and condensers. '057 Patent, 1:14-15. For example, in an automobile radiator, the heat from the engine coolant passes from the coolant to the interior surface of the radiator and then onto the

metal fins that extend from the body of the radiator. A fan blows air into the fins and away from the radiator.

Helically convoluted heat exchangers operate somewhat differently from a finned heat exchanger. By creating spiral-shaped channels in the walls of a metal tube, the surface area of the interior wall is increased, and the fluid passing through the tube is turbulated so that more of the fluid passing through the tube comes into contact with the wall. A tube made from metal like copper easily conducts heat through the metal from the interior wall of the tube to the exterior. By creating spiral channels in the tube, the heat spreads away more evenly and efficiently from the fluid to the wall of the tube than it would through a tube that is not helically convoluted. Methods for making helically convoluted exchangers are described in U.S. Patent Nos. 4,377,083 and 4,514,997. '057 Patent 1:15-22.

The patents-in-suit claim improvements over the prior art. As described in the Summary of the Invention:

An embodiment of the invention relates to a multi-passage heat exchange element which includes a central first fluid passage for passage of a first fluid of a heat exchanger, a plurality of substantially helically convoluted second fluid passages for a second fluid of a heat exchanger, the second fluid passages substantially helically surrounding at least a portion of the first fluid passage, and a plurality of substantially helically convoluted first fluid passages substantially surrounding at least a portion of the second fluid passages.

The specification explains the manufacturing process for an embodiment of the improved heat exchanger element. According to the specification, the process begins by tapering the ends of a metal tube with a tapering die. The tube, with its tapered ends, is depicted in Figure 3:

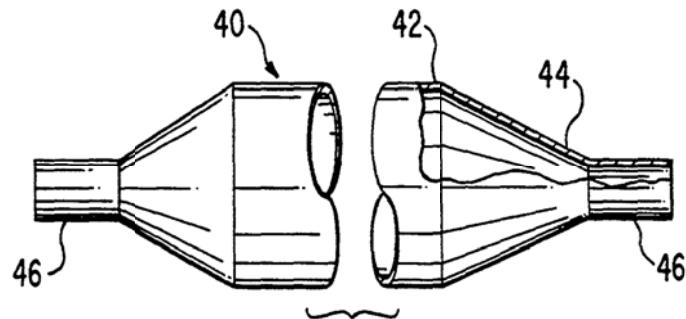


FIG. 3

The tapered tube is then passed into a tube corrugating die as shown in Figures 4-5. The die teeth are arranged so that when the tapered tube is passed into the die and the die is rotated about the tube, the resulting tube is a helically convoluted heat exchange element depicted in Figure 6, a cross-section of which is shown in Figure 7:

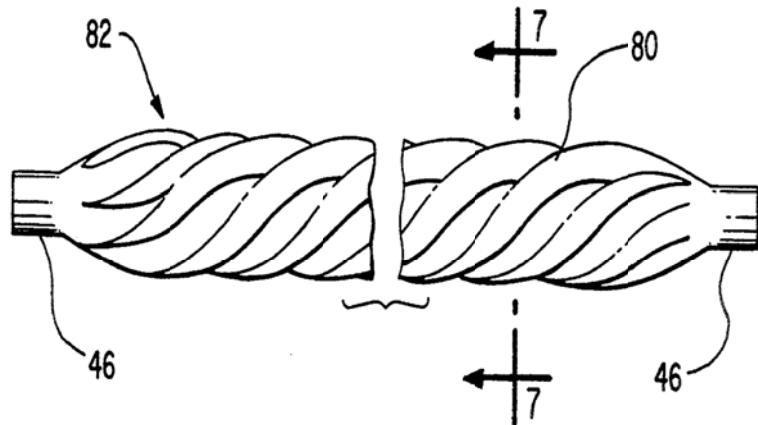
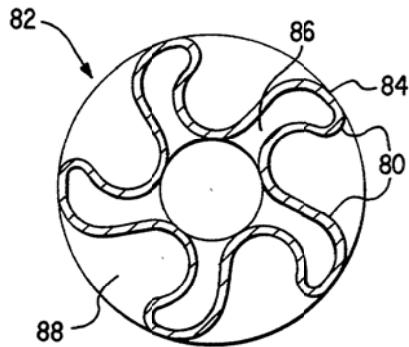


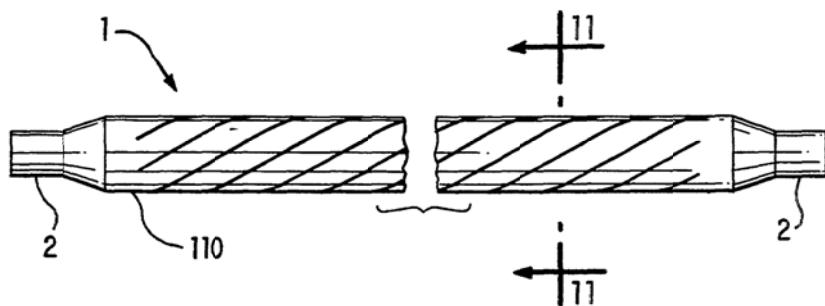
FIG. 6



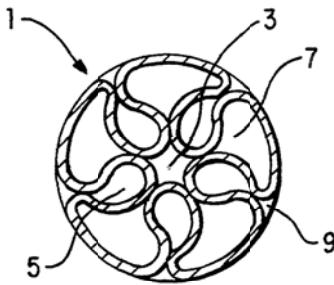
**FIG. 7**

The specification explains that this process facilitates the production of channels 88 which later become passages 5. '057 Patent, 21-40. Although the corrugated tube 82 shown in Figure 7 may be used as a heat exchange element, the specification explains that, preferably, the corrugated tube 82 is passed through a reducing die as shown in Figures 8 and 9. Essentially, the reducing die compresses the tube to reduce its diameter. By doing so, the channels and corrugations depicted in Figure 7 are formed into passages. "The resultant multi-passage element is shown in FIGS. 10-11." '057 Patent, at 3:50-51.

Figures 10 and 11 show a side view and cross-section of an example of the improved heat exchange element:



**FIG. 10**



**FIG. 11**

The preferred embodiment of the heat exchange element shown in Figs. 10 and 11 has a central passage 3 through which a first fluid may flow, surrounded by helically convoluted second fluid passages 5, through which a second fluid may flow. The fluid from the central first fluid passage may be directed into the helically convoluted first fluid passages 7 that surround the second fluid passages. The arrangement of the helically convoluted passage improves the efficiency of the heat exchanger, and, as the results of the experiment cited in the patent demonstrate, this configuration also allows the elements to be constructed with a smaller square footage of physical heat transfer area. '057 Patent at 5:44-6:27.

## **II. Legal Standards**

Summary judgment should be granted “if the movant shows that there is no genuine dispute as to any material fact and the movant is entitled to judgment as a matter of law.” Fed. R. Civ. P. 56(a). “By its very terms, this standard provides that the mere existence of some alleged factual dispute between the parties will not defeat an otherwise properly supported motion for summary judgment; the requirement is that there be no genuine issue of material fact.” *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 247-48 (1986). The substantive law identifies the material facts, and disputes over facts that are irrelevant or unnecessary will not

defeat a motion for summary judgment. *Id.* at 248. A dispute about a material fact is “genuine” when the evidence is “such that a reasonable jury could return a verdict for the nonmoving party.” *Id.* In considering motions for summary judgment, the Court must draw all reasonable inferences in favor of the non-moving party. *Id.* at 255; *Delta & Pine Land Co. v. Nationwide Agribusiness Ins. Co.*, 530 F.3d 395, 398 (5th Cir. 2008).

### III. Analysis

As an initial matter, the Court considers whether Extek’s motion would resolve all patent issues. Extek contends that all of the asserted independent claims of the patents-in-suit require the following three elements:

a central first fluid passage for passage of a first fluid of a heat exchanger; a plurality of substantially helically convoluted second fluid passages for passage of a second fluid of a heat exchanger, the second fluid passages substantially surrounding at least a portion of the central passage;

a plurality of substantially helically convoluted first fluid passages for passage of the first fluid of a heat exchanger, the first fluid passages substantially surrounding at least a portion of the second fluid passages.

Thus, Extek contends, a grant of summary judgment of non-infringement, based on a finding that the accused devices do not meet either the “substantially helically convoluted second fluid passages” or “substantially helically convoluted first fluid passages” elements, would dispose of the case.

Packless argues that Extek’s motion will not resolve all patent issues because asserted method claim 32, which is dependent on claim 22, does not require any of the above three elements. Claims 22 and 32 of the ’057 Patent read as follows:

22. A heat exchange element made according to the process of: passing a tube through a die which is adapted to produce substantially helical corrugations in the tube, a cross section of a corrugation comprising a head portion and a neck portion, the neck portion being thinner than the head portion; and

passing the corrugated tube through a reduction die which is adapted to bend the corrugations to form a plurality of helically convoluted passages substantially surrounding at least a portion of a central passage in the tube.

32. The element of claim 22, further comprising an outer second fluid passage, the outer second fluid passage substantially surrounding at least a portion of the first fluid passage

'057 Patent (emphases added). Extek replies that claims 22 and 32, like the three elements cited above, ultimately require a central passage, first fluid passages, and second fluid passages. The Court agrees. As underlined above, claims 22 and 32, as well as the three elements Extek identifies, require a central passage, first fluid passages, and second fluid passages. Packless does not dispute such requirement in its sur-reply. Accordingly, a grant of summary judgment of non-infringement finding that the accused products do not meet either the "substantially helically convoluted second fluid passages" or "substantially helically convoluted first fluid passages" elements, as properly construed, would dispose of all infringement claims.

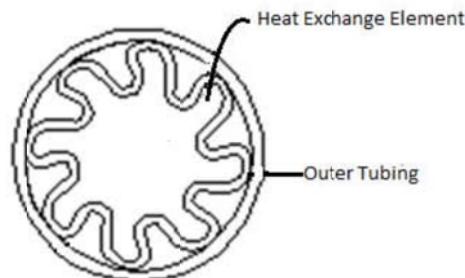
The Court next turns to whether there are any genuine issues of material facts that would warrant a trial on Packless' infringement claims, either literally or under the doctrine of equivalents, regarding the '057 Patent and the '504 Patent.

*a. Literal Infringement*

Determining whether a product or method literally infringes a patent is a two-step process. *ActiveVideo Networks, Inc. v. Verizon Commc'ns, Inc.*, 694 F.3d 1312, 1319 (Fed. Cir. 2012). First, the Court must determine the proper construction of the asserted claims, which is a matter of law. *Id.* Second, the finder of fact must determine whether the asserted claim, as properly construed, "reads" on the product or method. *Id.* In other words, "a patentee must supply sufficient evidence to prove that the accused product or process contains . . . every limitation of the properly construed claim." *Seal-Flex, Inc. v. Athletic Track and Court Const.*, 172 F.3d 836, 842 (Fed. Cir. 1999).

The Court has issued its construction of the disputed claim terms. (*See* Dkt. No. 101.) The parties' proposed constructions of the terms "substantially helically convoluted second fluid passages" and "substantially helically convoluted first fluid passages" were greatly disputed at the claim construction hearing. The primary dispute was the definition of a "passage" and whether the first and second fluid passages must be "distinct from" the central first fluid passages. (*Id.* at 9.) The Court concluded that "the passages are distinct from one another" and construed the term "substantially helically convoluted second fluid passages" to mean "multiple elongated passages, distinct from the central first fluid passage and the first fluid passages, that are substantially helically convoluted." (*Id.* at 11.) Similarly, the Court construed the term "substantially helically convoluted first fluid passages" to mean "multiple elongated passages, distinct from the central first fluid passage the second fluid passages, that are substantially helically convoluted." (*Id.*)

Extek contends that the asserted independent claims as properly construed do not read on the accused products. The claims require three distinct passages: a central first fluid passage, a first fluid passage, and a second fluid passage. Extek argues that the accused products have two passages, not three. In support, Extek presents a cross-section view of the accused heat exchange element:

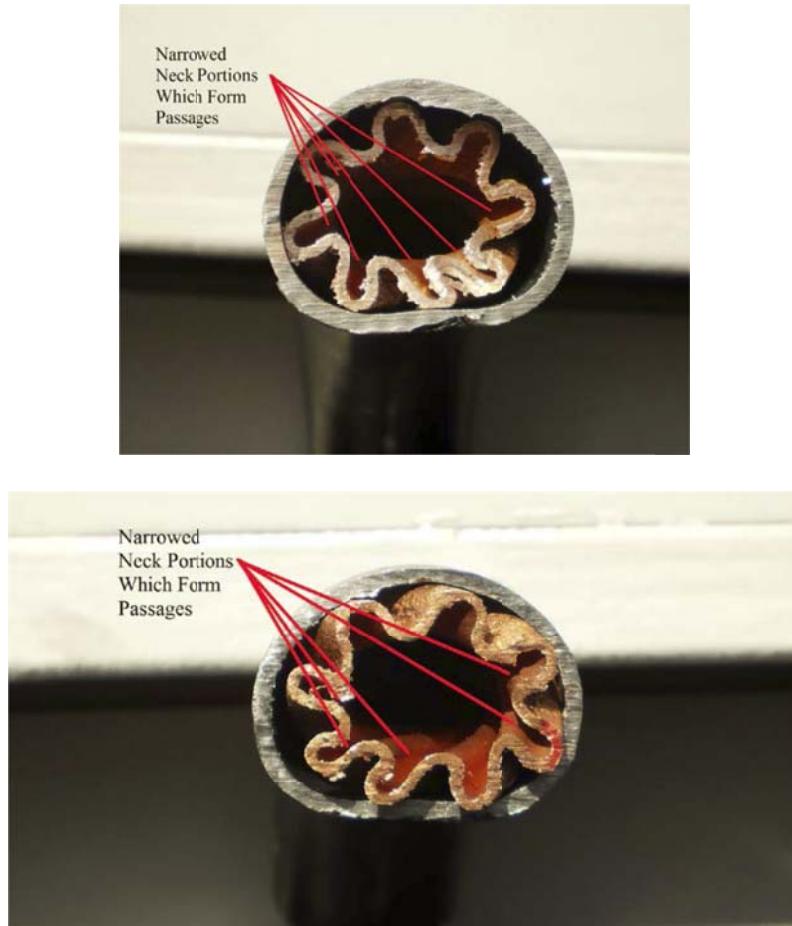


In other words, Extek argues that the accused products do not have either first or second fluid passages that are distinct from a central first fluid passage. Extek further argues that the accused products do not have passages “substantially surrounding a portion of” other passages.

In response, Packless contends that “some of the accused products are not circular in cross section” as depicted in Extek’s cross-section drawing. (Dkt. No. 87 at 9.) Instead, some products are a “somewhat crushed and compacted oval shape”:



(*Id.* at 6.) According to Packless, the crushed and compacted oval shape is a result of the manufacturing process. When the outer pipe along with the inner helically convoluted pipe is bent into the spiraled shape of the heat exchanger, the inner helically convoluted pipe becomes crushed and compacted. (*Id.* at 8-9.) It is this process that creates a “significantly narrowed neck portion for the first fluid passage, which becomes a way to contain fluid within the first fluid passage,” and “results in the first fluid passages having necks and heads in a boot, shoe, and/or teardrop shape.” (*Id.* at 9-10.) In support, Packless provides a picture of each end of one of the accused products:



(*Id.* at 9.) Packless argues that the “shape and physical characteristics of the first fluid passage” (i.e. the narrowed neck portions that result in the first fluid passages having necks and heads in a boot, shoe, and/or teardrop shape) make the first fluid passages “distinct from the shape and physical characteristics of the central fluid passage.” (*Id.* at 10.) Specifically, the shape “forces the fluid within these [first fluid] passages to be distinct in how they travel within the heat exchanger” as the fluids will have “different pressure losses, different frictional rates, different flow patterns, and different heat exchange characteristics.” (*Id.* at 10-11.)

The Court first notes that Packless presents no opposition to Extek’s contention that circular shaped tubes do not read on the asserted claims. Since Packless has failed to present any evidence on whether the circular shaped accused products meet the “substantially helically

convoluted second fluid passages” or “substantially helically convoluted first fluid passages” elements, the Court finds that Extek’s motion for summary judgment of non-infringement should be **GRANTED** with respect to any circular shaped accused products.

Packless argues only that the compacted oval shaped tubes read on the asserted claims because different pressures losses, different frictional rates, different flow patterns, and different heat exchange characteristics or certain passages constitute “distinct” passages. Such an argument flatly contradicts this Court’s claim construction ruling and is similar to arguments considered and rejected by this Court during the claim construction process. As this Court explained in its claim construction ruling:

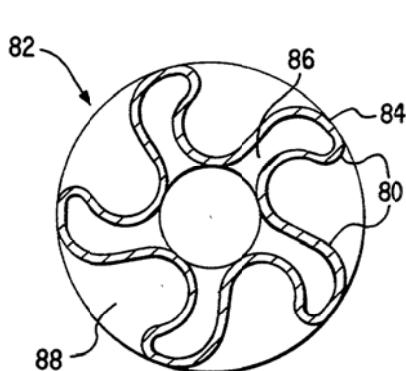
In every discussion or illustration of “passages” in the patent, the passage is shown as a distinct, or enclosed, path through which fluid may flow. The cross-sectional depictions of the heat exchange element through the manufacturing process shows that a channel opens into a central portion of the tubing. The passages, however, are surrounded by walls on their perimeters.

(Dkt. No. 101 at 10.) A “channel” opens into a central portion of the tubing. A “passage,” on the other hand, is a distinct, or enclosed, path; it is surrounded by walls on all their perimeters. It is thus not the different pressures losses, different frictional rates, different flow patterns, and different heat exchange characteristics that create distinct passages, but the presence of an enclosure or wall surrounding all of the passages’ perimeters. Packless makes no argument and it fails to present any evidence that such an enclosure or wall exists within the accused products.

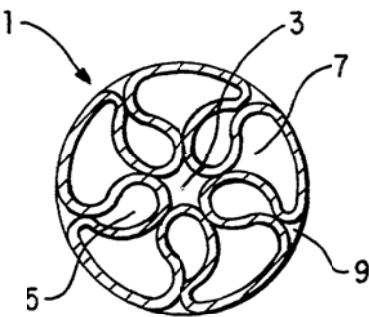
In point of fact, Packless repeatedly reasserts its claim construction argument—that this Court has rejected—that the patent does not require such a wall or enclosure. (See Dkt. No. 87 at 8-11.) In support, Packless asserts that the patents-in-suit “specifically contemplate that the first fluid in the central first fluid passage can leak to the first fluid passages during use, and vice versa.” (*Id.* at 11.) While this Court’s claim construction ruling acknowledged that “some fluid leakage between the passages may occur as a result of pressure differentials and the hydraulic

efficiency of the passages,” such potential leakage cannot occur as the result of the absence of an enclosure or wall. (Dkt. No. 101 at 10-11 (concluding that, despite some fluid leakage between the passages, “the specification nevertheless supports Defendant’s argument that the passages be distinct from one another” as described above).) Packless simply cannot defeat an otherwise proper summary judgment by attempting to recast its prior claim construction arguments which this Court has already rejected.

Packless’ argument that necks and heads in a boot, shoe, and/or teardrop shape form distinct passages also contradicts the specification of the ’057 Patent. In distinguishing channels from passages, the specification states that the “larger head portions 84 and the thinner neck portions 86 in the corrugations 80 facilitate production of channels 88, which later become passages 5 in the finished element.” ’057 Patent at 3:28-32.



**FIG. 7**



**FIG. 11**

In other words, larger head portions and thinner neck portions facilitate channels, not passages. For this reason, the Court found that Figure 7 (containing channels, which are not “distinct” from the central first fluid passage) is not an embodiment of the invention, whereas Figure 11 is a preferred embodiment. (See Dkt. No. 101 at 10.) By the same reasoning, Packless’ arguments

notwithstanding, having necks and heads in a boot, shoe, and/or teardrop shape—i.e. larger head portions and thinner neck portions—will form channels, but will not form passages. This is the undisputed reality that confronts this Court by way of Extek’s motion for summary judgment.

For the reasons cited above, the Court finds that there is not, and Packless has failed to present, any evidence from which a reasonable jury could find that the accused products meet the “substantially helically convoluted second fluid passages” or “substantially helically convoluted first fluid passages” elements as properly construed. Accordingly, Extek’s motion for summary judgment of non-infringement should be **GRANTED**.

*b. Doctrine of Equivalents*

To find infringement under the doctrine of equivalents, any differences between the claimed invention and the accused product must be insubstantial. *Graver Tank & Mfg. Co. v. Linde Air Prods. Co.*, 339 U.S. 605, 608 (1950). One way of proving infringement under the doctrine of equivalents is to show, for each claim limitation, that the accused product “performs substantially the same function in substantially the same way with substantially the same result as each claim limitation of the patented product.” *Crown Packaging Tech., Inc. v. Rexam Beverage Can Co.*, 559 F.3d 1308, 1312 (Fed. Cir. 2009). “Application of the doctrine of equivalents is the exception, however, not the rule, for if the public comes to believe (or fear) that the language of patent claims can never be relied on, and that the doctrine of equivalents is simply the second prong of every infringement charge, regularly available to extend protection beyond the scope of the claims, then claims will cease to serve their intended purpose.” *Wallace London & Clemco Prods. v. Carson Pirie Scott & Co.*, 946 F.2d 1534, 1538 (Fed. Cir. 1991). To support a finding of infringement under the doctrine of equivalents, a patentee must provide particularized testimony and explanatory argument linking the evidence of equivalence to the

three legal elements of function, way, and result. *Tex. Instruments Inc. v. Cypress Semiconductor Corp.*, 90 F.3d 1558, 1566-67 (Fed. Cir. 1996).

The Court finds that the doctrine of equivalents should not apply here, as Packless proposes, because it would vitiate the claim elements requiring “substantially helically convoluted second fluid passages” or “substantially helically convoluted first fluid passages.” *See, e.g., Deere & Co. v. Bush Hog, LLC*, 703 F.3d 1349 (Fed. Cir. 2012) (“[C]ourts properly refuse to apply the doctrine of equivalents ‘where the accused device contain[s] the antithesis of the claimed structure’ . . . [because such application] would ‘vitiate’ a claim element.”) (quoting *Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 39 n.8 (1997); *Planet Bingo, LLC v. Gametech Int'l, Inc.*, 472 F.3d 1338, 1345 (Fed. Cir. 2006)). Packless’ only particularized testimony and linking argument supporting infringement under the doctrine of equivalents is summarized in its expert’s declaration:

The characteristics of the passages with the significantly bent necks (e.g., the shapes, leaking between the passages, and different flow parameters, pressure losses, flow times, flow rates, frictional rates, flow patterns, and heat exchange rates) make the first fluid passage substantially equivalent to the first fluid passage set forth in the asserted patents. Such difference is insubstantial. The significantly bent necks in the accused products perform substantially the same function in substantially the same way to obtain the same result as the first fluid passage in the asserted patents.

(Dkt. No. 87 Ex. 2 at ¶ 15.) Packless, in essence, repeats its arguments with respect to literal infringement that the unique shapes in the accused products form distinct passages. According to the specification and as discussed above, however, such shapes facilitate channels and not passages. *See supra* at 12-13 (citing ’057 Patent at 3:28-32). To therefore argue that such shapes are equivalent to the “passages” of the claimed elements would necessarily equate “passages” with “channels.”

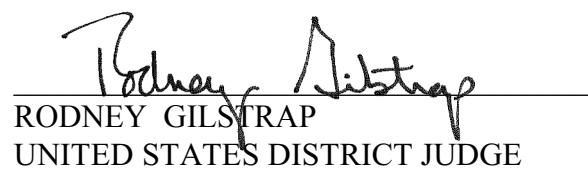
Such equivalence is improper under the doctrine of equivalents because the differences between channels and passages are not insubstantial. The specification and this Court’s claim construction ruling draws a marked difference between passages and channels. *See supra* at 12-13 (stating that Figure 7 is not an embodiment of the invention because it contains channels and not passages such as in Figure 11). Thus, the proposed application of the doctrine of equivalents—claiming infringement under the doctrine of equivalents for accused devices comprised of “channels,” but where the claim calls for “passages”—would vitiate the claim elements requiring “substantially helically convoluted second fluid passages” or “substantially helically convoluted first fluid passages.” *See, e.g., Planet Bingo*, 472 F.3d at 1345 (refusing to apply the doctrine where the proposed application would change “before” to “after,” which was a “marked difference”); *Asyst Techs., Inc. v. Emtrak, Inc.*, 402 F.3d 1188 (Fed. Cir. 2005) (refusing to apply the doctrine where the proposed application would change “mounted” to “unmounted”); *Moore U.S.A., Inc. v. Standard Register Co.*, 229 F.3d 1091 (Fed. Cir. 2000) (refusing to apply the doctrine where the proposed application would change “majority” to “minority”).

Accordingly, the Court finds that there is insufficient evidence for a jury to conclude that the asserted equivalence represents an insubstantial difference from the claimed elements. Extek’s motion for summary judgment of non-infringement under the doctrine of equivalents should be **GRANTED**.

#### **IV. Conclusion**

For the reasons stated herein, the Court finds that Extek’s motion for summary judgment of non-infringement of the ’057 and ’504 Patents should be and is hereby **GRANTED** in all aspects.

**So ORDERED and SIGNED this 22nd day of February, 2013.**

  
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RODNEY GILSTRAP  
UNITED STATES DISTRICT JUDGE